### Course Information

#### Confidential

<table>
<thead>
<tr>
<th>Code</th>
<th>PHY406</th>
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<tbody>
<tr>
<td>Course</td>
<td>Physics I</td>
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<tr>
<td>Level</td>
<td>Degree</td>
</tr>
<tr>
<td>Credit Unit</td>
<td>3</td>
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<tr>
<td>Contact Hour</td>
<td>Lecture (2hrs/week); Practical (2 hrs/week)</td>
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<tr>
<td>Part</td>
<td>1</td>
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<tr>
<td>Prerequisite</td>
<td>None</td>
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<tr>
<td>Course Outcomes</td>
<td>Upon completion of this course, students should be able to:</td>
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1. State, write and explain the concepts, laws and theories in mechanics, matter and thermodynamics.

2. Plan, conduct, and report scientific investigations in areas of mechanics, matter and thermodynamics.

3. Verbally justify and convince peers and the facilitator, their rationale for the choice of methods, their ability to use and manipulate equipments, the need to transform raw scores into tabular and graphical forms and their ability to explain and interpret results of their investigation in areas of mechanics, matter and thermodynamics.

#### Course Description

This course will interactively engage students cognitively and scientifically in areas of mechanics, matter and thermodynamics. Students will define concepts, state and explain laws and theories, make predictions as to the possible outcome of an event, perform investigations via laboratory exercises and verbally and in writing, discuss the results and relationships with peers and lecturer. The designated lecture session is used to discuss results of investigations leading to its relation to the existing laws, principles or theories. Lecture
sessions employ a mixture of lectures and active learning (self and peer discussions). The outcomes shall be assessed through a variety of tools which include the traditional paper examination, informal interviews and classroom engagement.

Syllabus Content

1.0 Measurement
   1.1 Physical quantities: Basic and derived quantities
   1.2 System of unit: SI unit and unit conversion
   1.3 Dimension and Dimensional Analysis

2.0 Vector
   2.1 Vectors and Scalars
   2.2 Some properties of Vectors
   2.3 Addition of Vectors: Graphical methods and Analytical methods
   2.4 Unit Vectors
   2.5 Multiplying Vectors
   2.6 Application of vectors: Resultant velocity, static equilibrium under concurrent forces

3.0 Kinematics in One Dimension
   3.1 Displacement, velocity and acceleration
   3.2 Equations of kinematics for constant acceleration
   3.3 Freely Falling object
   3.4 Graphical analysis of velocity and acceleration

4.0 Newton’s Laws of Motion
   4.1 The concepts of force and mass
   4.2 Newton’s First Law of Motion
   4.3 Newton’s Second Law of Motion
   4.4 Newton’s Third Law of Motion
   4.5 Type of force: Gravitational force, normal force, frictional force and tension force
   4.6 Application of Newton’s Law

5.0 Work
   5.1 Work done by constant force
   5.2 The work-energy theorem
   5.3 Gravitational potential energy
   5.4 Mechanical types of energy
6.0 Momentum
   6.1 The Impulse-momentum theorem
   6.2 The principle of conservation of linear momentum
   6.3 Collisions: elastic and inelastic collisions
   6.4 Collisions in one dimension

7.0 Rotational Motion
   7.1 Angular displacement, angular velocity and angular acceleration
   7.2 The equations of rotational kinematics
   7.3 Relationships between angular variables and tangential variables
   7.4 Centripetal acceleration and tangential acceleration

8.0 Mechanics of solid
   8.1 Elasticity: stress and strain
   8.2 Modulus (Young, Shear and Bulk)

9.0 Mechanics of fluids
   9.1 Fluid density
   9.2 Buoyancy
   9.3 Archimedes' Principle

10.0 Thermodynamics
   10.1 Thermal properties of matter
   10.2 Phases of matter
   10.3 Heat and temperature change: specific heat capacity
   10.4 Heat and phase change: latent heat
   10.5 The First law of thermodynamics
   10.6 The Second law of thermodynamics
   10.7 Heat transfer
Teaching Methodology

Predict → Observe → Do → Synthesize (PODS) Cycle

i. Lecture-discussion
ii. Active engagement via lecture-discussion
iii. Scientific investigation via laboratories experiences

Assessment

Course Work: 60%

Cognitive 40%
- Three tests 3x10% = 30%
- Four quizzes 4x2.5% = 10%

Practical Skills 20%
- Lab report 10%
- Viva 10%

Final exam 40%

Recommended Text

Physics by Cutnell & Johnson 7th edition (algebra based); John Wiley & Sons, Inc.

References

Fundamental of Physics by Halliday, Resnick, Walker, 6th or 7th Ed., John Wiley & Sons, Inc.
# COURSE OUTCOMES

<table>
<thead>
<tr>
<th>COURSE CODE</th>
<th>PHY406</th>
<th>CENTRE OF STUDY</th>
<th>FACULTY OF APPLIED SCIENCES</th>
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<tbody>
<tr>
<td>COURSE NAME</td>
<td>PHYSICS I</td>
<td>PREPARED BY</td>
<td>ASIAH MOHD NOR/ PROF MADA YMDIARRIS ABU YAMIN</td>
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<tr>
<td>CREDIT HOURS</td>
<td>3</td>
<td>DATE</td>
<td>8\textsuperscript{th} JUN 2008</td>
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## COURSE OUTCOMES

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<th>LO1</th>
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<th>LO5</th>
<th>LO6</th>
<th>LO7</th>
<th>LO8</th>
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### COURSE OUTCOMES

1. State, write and explain the concepts, laws and theories in mechanics, matter and thermodynamics

   - Independent Learning (pre-class reading)
   - Lecture-discussion
   - Active learning (self & peer dialogue)

2. Plan, conduct and report scientific investigations in areas of mechanics, matter and thermodynamics

   - Independent Learning (pre-class reading)
   - Active learning (self & peer dialogue)

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Namun Fakulti / Pusat: Fakultai Sains Gunaan
Pengajian: Ijazah Sarjana Muda (Kepujian) Teknologi Bahan, Teknologi Makanan dan Teknologi Tekstil
Tahun: 2008

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<table>
<thead>
<tr>
<th>COURSE OUTCOMES</th>
<th>PROGRAMME OUTCOMES</th>
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<tbody>
<tr>
<td>LO1 LO2 LO3 LO4 LO5 LO6 LO7 LO8 LO9</td>
<td>▪ Labs</td>
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<td>3. Verbally justify and convince peers and the facilitator, their rationale for the choice of methods, their ability to use and manipulate equipments, the need to transform raw scores into tabular and graphical forms and their ability to explain and interpret results of their investigation in areas of mechanics, matter and thermodynamics.</td>
<td>▪ Active learning (self &amp; peer dialogue)</td>
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<td>▪ Discussion</td>
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<td>▪ Visual Observation</td>
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Program Outcomes:

LO1 Ability to apply the fundamentals of basic and applied physics.
LO2 Ability to conduct physics-related investigations, analyze and interpret physical data.
LO3 Ability to apply scientific techniques and skills in solving physics related problems.
LO4 Ability to orally express and disseminate scientific ideas and findings effectively.
LO5 Ability to express and disseminate scientific ideas and findings in writing effectively.
LO6 Ability to work in team in physics-related projects.
LO7 Ability to apply managerial and entrepreneurial skills.
LO8 Ability to manage information and engage in life-long learning.
LO9